CHAPTER I

INTRODUCTION

A. Background

Road material is a mixture of aggregate and binder material to support and serve the traffic load on roads in order to facilitate land transportation.The process of pavement manufacture is influenced by several aspects. Based on the binder material pavement can be divided by two types, flexible pavement and rigid pavement (Mannering a Wasburn, 2013). Pavement type selection depends on the subgride condition. Rigid pavement commonly used in basic soil conditions that have a lower carrying capacity. To achieve the desired strength of the mixture of aggregate and asphalt on the pavement must have a density in accordance with specifications.

Foam asphalt is a mixture of air, water and asphalt that was mixed with a certain composition. Foam asphalt is produced by injecting water into the hot asphalt in the foaming chamber. Foam asphalt can be used as the stabilizer material for almost all kind of materials.

During awareness of many people about the conservation of nature and the environment,material pavement which has been damaged nowadays people has begun to be used with unearthed and destroyed into a kind of aggregate that will produce a binder content which is called by RAP (*Reclaimed Asphalt Pavement*). The mixture of RAP (*Reclaimed Asphalt Pavement*) needs a modified in order to fulfill the mix quality requirements that are targeted.

The compaction is process by which solid particles are obtained by mechanically so that the volume of the cavity in the mixture decreases and compaction mixture increases also organize the distribution of aggregate particles into the aggregate mixture resulting optimal configuration to get the compaction that was targeted. The Compactor can be said good when it is capable of distributing the load leveling vertically or horizontally. In this case we can see when the compaction of asphalt mixture can produce void distribution and orientation of the aggregate good.

Compaction of asphalt concrete when using a tandem roller by means passing. For the compactor which used in this final project is a slab roller compactors and Marshall hammer. This tool has a compaction system resemble roller tandem which the compaction is obtained by passing and Marshall hammer which the compaction is obtained by blows.

According to this case, the writer will conduct a further study of the roller compactor under the title "Comparison Analysis Of Foamed Asphalt Mixture Using Reclaimed Asphalt Pavement Compacted By Slab Roller And Marshall Hammer". In this case the sample has impacted will be taken by using a core drill and test specimens are cut vertically or horizontally to determine the movement of aggregate on the test object.

B. Problem Formulation

Based on the explanation of the background research, it can be formulated with the following issues:

1. How does the aggregate results of the orientation and void distribution cold mix RAP compacted using a slab roller compactor?
2. How is the aggregate result of the orientation and void distribution cold mix RAP compacted using a compactor Marshall hammer?
3. How orientation ratio of aggregate and void distribution cold mix RAPcompacted using a slab roller compactor and Marshall hammer?

C. Research Purposes

The purpose of the research in this study are as follows:

1. Analysis of results orientation and distribution void aggregate compacted using a roller compactor slab.
2. Analysis of results orientation and distribution void aggregate compacted using a compactor Marshall hammer.
3. Comparative analysis of aggregate results orientation and distribution of the voids between the two slab roller compactor and Marshall hammer.

D. Benefits of Research

The benefits of this research are as follows:

1. Knowing the advantages and disadvantages of the roller compactor to be developed so that the results from the roller compactor can resemble the rollers on the groundthat tandem roller compactor and as a science of the movement of aggregate under the influence of compaction and distribution of void between slab roller compactor and compactor Marshall hammer.
2. Giving insight knowledge to be more efficiency in the cost because of RAP materials is produced from chunks of asphalt that are not used any more which is recycled again as material pavement.
3. Real contribution in preserving the environment..

E. Limitation

Limitation Problem in this study are as follows:

1. Research conducted at the Laboratory of Civil Engineering Universitas Muhammadiyah Surakarta and in PT. Tindodi Karya Lestari, Tangerang.
2. Aggregate gradation used is *AC - WC* specification.
3. The mixture specification uses BinaMarga 2010 revision 3.
4. Asphalt used is penetration asphalt 60/70.
5. Aggregate used RAP.
6. RAP is derived from Comal, Pekalongan, Central Java.
7. Asphalt content of 2,3%.
8. Foam asphalt mixing temperature 140°C - 160°C.
9. The study, produced by Marshall hammer compactor using secondary data from Jodi Kusuma Negara

F. Similarities and Differences with Similar Research

Similarities and differences with previous studies of this research can be seen in Table I.1. Similarities and differencesthe study below:

Table I.1 Similarities and differences of similar research

Description	**The proposed research**	**Pancar (2009)**	**Rahman (2010)**
Title	Comparison Analysis Of Foamed Asphalt Mixture Using Reclaimed Asphalt Pavement Compacted By Slab Roller And Marshall Hammer	Comparison orientation compacted asphalt aggregate using a slab roller compactor and stamper.	Analysis of density characteristics of asphalt mix aggregate *(asphalt concrete)* are compacted with stamper.
Purpose	Knowing the aggregate results of the orientation and void distribution cold mix RAP compacted using a slab roller compactor. Knowing the aggregate result of the orientation and void distribution cold mix RAP compacted using a compactor Marshall hammer. Knowing orientation ratio of aggregate and void distribution cold mix RAP compacted using a roller slab compactor and Marshall hammer.	Knowing the orientation of the aggregate if blows and compacted manner by means of ground. Identifying the void distribution mix asphalt concrete compacted using a stamper and a slab roller compactor.	Knowing the number of collisions on the stamper tool that is equivalent to the roller marshall hammer in the laboratory. Identify the void distribution and orientation of aggregate in asphalt concrete mixture when compacted with a stamper. Identify the characteristics of the density of asphalt concrete.

NextTable I.1 Similarities and Differences of Similar Research

Description	**The proposed research**	**Pancar (2009)**	**Rahman (2010)**
Material	*Asphalt Concrete*	*Asphalt Concrete*	*Asphalt Concrete*
Compacting Tools	Run Over Compacting Tools	Compacting tools *roller slab*and*stamper*	Compacting tools*marshall hammer*and*stamper*
Test Equipment Specimen	*Marshall test*	*Marshall test*	*Marshall test*

Research carried out at this time trying to analyze the density of a mixture of asphalt concrete using foam asphalt and RAP *(Reclaimed Asphalt Pavement)* with a slab roller compactor and Marshall hammer. Where the research has not been done by previous research, especially in the Department of Civil Engineering, Faculty of Engineering, Muhammadiyah University of Surakarta.

G. Originality of The Study

The research under title "Comparison Analysis Of Foamed Asphalt Mixture Using Reclaimed Asphalt Pavement Compacted By Slab Roller And Marshall Hammer" this research has never been done by previous research,but there is some research which has similarity with this research :

1. Pancar, 2013. The comparison of compacted asphalt aggregate orientation using roller slab compactor and stamper.
2. Rahman, 2010. Analysis of density characteristics of the asphalt concrete are compacted with astamper.